DISLOCATION OF THE HUMERUS, COMPLICATED BY FRACTURE AT OR NEAR THE SURGICAL NECK.[1]

By CHARLES BALDWIN LYMAN, M.D.,

OF DENVER, COL.,

PROFESSOR OF FRACTURES AND DISLOCATIONS, DENVER COLLEGE OF MEDICINE; VISITING SURGEON TO ST. JOSEPH'S AND ARAPAHOE COUNTY HOSPITALS.

This injury is a comparatively rare one, and it seldom falls to the lot of a surgeon to see three cases.

Up to the year 1894 there had been reported 117 cases of dislocation of the shoulder-joint, complicated by fracture of the humerus in its upper portion. No single observer had reported more than five cases. In January of that year, McBurney read a paper before the New York Surgical Society, which was published in the ANNALS OF SURGERY for that year, in which he reports one case. Since that time there has been only one other case reported so far as I know, and that by McBurney in 1896. This, together with the three which I have the honor to report to-day, makes a total of 122 cases.

The injury is an important one, on account of the difficulties encountered in treatment and the very serious impairment of function resulting in a majority of the cases reported up to the publication of McBurney's article in 1894.

The form of dislocation usually found in these cases is the subcoracoid variety, the head being displaced downward and inward, lying under the coracoid process. It is also sometimes rotated on its axis, in which case the fractured surfaces are carried farther apart. It is not at all surprising that this should be the form of dislocation found in these cases, as we know

[1] Read before the Colorado State Medical Society, June 20, 1900.

that in the simple, uncomplicated cases the subcoracoid variety makes up about 75 per cent. of all cases.

As to the seat of the fracture, we find that of the 122 reported cases, the fracture was said to have existed at the surgical neck in seventy-three; at the anatomical neck in twenty-eight. In eleven of the cases, it was said that the fracture "occurred at the neck." In six, there was fracture both of the anatomical and surgical necks, and in three cases it was simply stated that the fracture was in the upper part of the humerus.

In two of the cases which I report, the line of fracture was through the surgical neck, in the other case it was somewhat below that point. The direction of the line of fracture has varied in all these cases, but in the cases I have seen the line was oblique and the direction of obliquity was upward and outward. The upper end of the lower fragment usually lies external to the small fragment and is drawn upward towards the glenoid cavity.

As to the history of injury and the mode of production, we find that this has not been accurately noted. McBurney and Stimson both say that it is quite probable that in a large number of the cases the injury was produced in the usual way, namely, by sudden abduction of the arm carried to the point of hyperabduction, as often results from falls upon the extended arm or upon the elbow; and that the fracture takes place through continued abduction, combined, perhaps, with forced rotation, the edge of the glenoid cavity, or the acromion process, acting as a fulcrum.

In the cases which I have seen, the injury has resulted from direct violence inflicted at the seat of injury either from a fall or a blow upon the shoulder. It is quite reasonable to suppose that in some of the cases the original injury was a simple dislocation, and that the fracture was the result of violence at the hands of the surgeon while attempting to reduce the dislocation.

Diagnosis.—This is sometimes far from easy, especially when the injury to the bony structure is accompanied by a large amount of contusion and swelling of the soft tissues. But if

the surgeon will bear well in mind the landmarks and signs of each injury, he should not make a mistake.

We rely for diagnosis upon the following signs: First, the absence of the head of the bone in the glenoid cavity and its presence in a new location under the coracoid process, which can be made out even in a very fleshy subject and where there is a large amount of contusion and swelling. Second, there will be a sharp outline to the shoulder, caused by the prominence of the tip of the acromion process. Third, the circumference of the shoulder measured through the axilla will be increased. Fourth, the arm will be freely movable and can be easily approximated to the side, which would not be the case in a simple, uncomplicated dislocation, excepting where there had been a complete laceration of the capsular ligament. Fifth, the head of the humerus would not rotate with the shaft of the bone in rotation of the arm. This sign is the most important of all, as it removes all doubt about solution of continuity in the humerus, and, as I have already said, one should always be able to make out the head and feel it under the fingers. Measurements of the upper arm will show shortening and crepitus may be felt. Lastly, should there be any doubt as to the conditions present, the X-rays should be utilized to clear up things.

Prognosis.—Until within the last few years, the prognosis was decidedly bad as far as restoration of function of the extremity was concerned. In only a few of the cases seen was it possible to restore the head of the bone to its normal position in the glenoid cavity. In some of the cases, the fracture was treated and nothing done with the dislocation, with the idea in view that, after union of the fracture had taken place, the dislocation could be reduced. There is no successful case of this kind on record. Others endeavored to prevent union of the fragments, and to establish a false joint at the seat of fracture. The results from this method were only partially successful. Others, again, resorted to open incision of the joint and resection of the upper fragment; this, too, was not satisfactory.

In six of the 122 cases, the head was reduced through an open incision of the joint; and in all six it was necesssary to remove the upper fragment either at the time or subsequently. There have been four cases recorded now, including my own, where the dislocation was reduced, by the method which I will describe, with results that were entirely satisfactory. In the light of my own experience, I should say that, whereas the injury is certainly a grave one, the prognosis under proper treatment is fairly good.

Treatment.—The treatment of this particular injury has excited interest for many years, even as far back as the year 1835; and all the authorities have been united in the opinion that here we have a condition hard to cope with, and one where the results have been far from satisfactory. All surgeons have been agreed upon one thing, namely, that when a fracture and a dislocation of the same bone exist, the dislocation should be remedied first and the fracture last. Reference to authorities prior to the year 1894 show that each and every one of them advise that every endeavor should be made by direct manipulation, by extension and leverage, under an anæsthetic, to reduce the dislocation. It is also recorded by them that these methods were usually unsuccessful.

We find that in event of failure there were several methods of procedure advised: First, to treat the fracture and obtain union, leaving the head of the bone in its new position with the hope that a new socket would be formed that would be of some service; second, to prevent the fractured surfaces from uniting by daily manipulations, thus causing a false articulation to form at the seat of fracture, which might, in a measure, act as a substitute for the normal shoulder-joint. These procedures are certainly both unsurgical, and are not to be thought of at the present time; third, to secure union of the fracture and then make an attempt at reduction of the dislocation. This is also to be condemned, for we can never be certain that union will take place; and, if it does, it may be delayed long beyond the usual length of time, and every week of delay means a diminished chance for reduction of the dislocation.

Then, again, union may take place with a large amount of deformity, owing to the fact that the small, upper fragment cannot be properly adjusted or held in place. Oger reports ten cases where this was done, and in only three of these was it possible to reduce the dislocation afterwards. Of the methods for reduction advised, the only one which to my mind seems justifiable is that of attempting to force the head of the bone into the glenoid cavity by direct pressure. Extension will avail nothing, as the force will be expended in pulling the fractured surfaces farther apart, and there is certainly great danger of doing irreparable damage to nerves, blood-vessels, and soft tissues in the neighborhood.

In one of the cases I reported, there had been considerable damage done to the soft tissues before I saw the case, by the long continued and repeated use of extension and pressure with the foot in the axilla. In one of the cases reported, death followed these manipulations, and was said to have been the direct result thereof.

The reason why these cases are so difficult to manage is that, owing to the shortness of the upper fragment and its deeply buried position, one is not able to grasp it for the purpose of producing extension. After going carefully over the literature of this subject prior to 1894, one can but feel that the methods advised were crude, unsurgical, and unsuccessful. The question is, Have we anything to offer to-day which is better? We have presented to us for our consideration two procedures: First, a resection of the small, upper fragment; second, cutting down upon the seat of fracture, exposing the upper fragment, and then, by means of a hook or forceps, pulling the head of the bone into the glenoid cavity. Of all these methods, I feel that resection should be excluded, or at least should not be thought of until everything else had failed, as it could certainly only leave the arm badly crippled. Opening the joint, liberating the resisting portion of the capsule, thus allowing of the easy reposition of the head of the bone, is certainly a procedure which is not contrary to good surgical

practice, and might possibly be considered in a certain number of cases.

The last procedure is the one which I especially desire to speak of,—the one first advised by McBurney. An incision is made on the outside of the arm and over the seat of the fracture, exposing the lower end of the upper fragment. A hole is then drilled on the side of the fragment and about three-fourths of an inch from the lower end. Into this hole is fitted the end of a specially constructed hook. Traction is then made in a line at a right angle to the body, the arm being held up by an assistant. It is usually a fairly easy matter to pull the head of the bone into the glenoid cavity. After this has been accomplished, the fracture is to be adjusted, and, if thought best, can be held in place by one of the numerous methods in vogue, such as wiring or the use of steel nails. The wound is then dressed and a dressing of plaster of Paris applied, extending from the neck to the hand.

McBurney had some doubt as to whether the bone would stand the amount of traction necessary to pull the head into place. He conducted some experiments with fresh bones and found that they would easily stand a strain of 175 pounds, which is more than would ordinarily be used in reducing a dislocation of this character. I have used this method in two of my cases with this modification: Instead of using the hook, I used a pair of forceps, so constructed that the end of the bone could be grasped without any danger of crushing it; the only portions of the forceps coming in contact with the bone were two sharp points on each jaw. These points would penetrate the periosteum and bury themselves in the bone without doing any damage.

Case I.—Mr. B. H., aged forty-two, single, consulted me, giving the following history: One year previous to this time, while in the woods chopping logs, a tree fell upon him, threw him to the ground and, striking him upon his right shoulder, produced a dislocation of the shoulder-joint and a fracture of the humerus at the surgical neck. He consulted a physician at that time, who made every reasonable endeavor to reduce the

dislocation of the humerus, but was unsuccessful. He then applied splints to the fracture to maintain the fragments in position for eight to ten weeks; at which time the splints were removed, and it was found that only partial union had been secured. When he was seen by me, there was fibrous union of the fracture; the head of the humerus lay underneath the coracoid process. In view of the fact that the head of the bone had been out of the glenoid cavity for one year, I determined that the proper thing to do was, first, to secure union in the fracture, and then, if it seemed advisable, to institute some operative procedure, with the idea in view of forming a new joint, or cleaning out the old glenoid cavity and making an effort to restore the head of the bone to its normal position. I therefore operated upon the fracture, cutting down upon the fragments; resected the ends; secured them to each other by means of silver wire; a plaster-of-Paris dressing was applied from the neck to the hand. After a rather prolonged period of time, union was secured in the fracture. The patient then left the city, and I did not see him again for three years, at which time he was on a visit to Denver, and I had an opportunity of making an examination of his arm. I found union perfectly solid in the fracture. He had quite free motion of the bone in its new position underneath the coracoid process. This motion, supplemented by a freely movable scapula, enabled him to use that arm almost as well as the uninjured one, as is evidenced by the fact that, after he left the city, he was employed by a telephone company in Chicago as a line repairer, being obliged to climb poles to repair wires. He tells me that he experienced no inconvenience whatever.

This case well illustrates one of the older methods of treatment of which I have made mention above, where it is advised to secure union of the fracture and leave the dislocation alone, and the result obtained in this case would certainly be called a good one.

CASE II.—Thomas W., aged forty-two, single, a miner, on May 31, 1897, fell down a slope in a mine fifty feet, striking several timbers on his way down; this served to break the force of the fall. He was taken out, and when examined was found to have innumerable contusions all over the body. It was also

found that he had sustained a dislocation of the right shoulder-joint. Several attempts were made by the surgeon at the mine to reduce the dislocation, but without success. He was brought to Denver, and I saw him seven days after the injury, at which time I found a large amount of ecchymosis and swelling about the shoulder-joint, in the axilla, and along the arm, some of which I attributed to the repeated manipulations. He was placed under an anæsthetic, and it was found that he had a subcoracoid dislocation of the right shoulder and a fracture of the surgical neck of the humerus. Whether this occurred at the time of the accident or was due to manipulations, I could not discover. Direct pressure was used to a moderate extent to try and reduce the dislocation, but without success. I then cut down upon the fracture, and with forceps grasped the lower end of the upper fragment, and, by exerting traction in a line at a right angle to the body, succeeded with a slight pull in reducing the dislocation. The fracture was adjusted, the ends being held in position with silver wire. The wound was stitched, dressed, and a plaster-of-Paris splint applied, extending from the neck to the hand. After three weeks he was sent home and placed under the care of the local surgeon, who later reported complete recovery and good use of the arm.

CASE III.—J. D., aged thirty-five, married, was thrown from a wagon, striking upon his shoulder and arm, among some boulders. When I saw him, I found he had a badly swollen and contused shoulder. Examination showed the head of the left humerus to be lying underneath the coracoid process, and from the mobility of his arm there was apparently a false joint below the glenoid cavity. The arm could be approximated to the side and the head could be felt to remain stationary when the arm was rotated. The arm measured a little more on this side than on the uninjured side. A diagnosis was made of dislocation complicated by a fracture. Attempts were made to reduce the dislocation, under ether, by direct pressure and gentle traction. This was unsuccessful. An incision was then made down upon the seat of fracture and traction carried out by means of forceps, as in the other case. Somewhat more difficulty was encountered, but by combining a slight amount of rotation and extension, reduction was accomplished. The fractured surfaces were held in position by the use of silver wire, as in the previous

case. The wound was stitched, dressed, and a plaster-of-Paris splint applied from the neck to the hand. The case pursued a perfectly normal course, and recovery with a perfectly useful arm resulted.

In both of these cases I was surprised at the small amount of force which was required to pull the head of the bone into the glenoid cavity. Both of these cases recovered with perfectly useful arms. The results were as good as is usually seen in a simple, uncomplicated dislocation of the shoulder.

From the experience I have had in these cases, I would say that when a surgeon sees a case of this kind, he is justified in using a moderate amount of direct pressure, under an anæsthetic, to reduce the dislocation; that extension with the foot in the axilla is to be condemned; and that if a very moderate amount of manipulation does not accomplish anything, he should then proceed to cut down on the fracture and reduce the dislocation according to the method of McBurney.